

Conference Reports

Industrial Ecology for a Sustainable Future

Report from the Second International Conference of ISIE

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Sangwon Suh^{1*} and Faye Duchin²

¹ Centre of Environmental Science (CML), Leiden University, PO Box 9518, 2300RA Leiden, the Netherlands

² Rensselaer Polytechnic Institute (RPI), 3408 Sage Lab, 110 8th St. Troy, NY 12180, USA

* Corresponding author (suh@cml.leidenuniv.nl)

Over 300 people from governmental organisations, industries, academia, research institutes and NGOs gathered at Ann Arbor, MI, USA for the conference *Industrial Ecology for a Sustainable Future*, co-organised by EDGAR HERTWICH and GREGORY KEOLEIAN. It was the second international conference of the International Society for Industrial Ecology (ISIE) following the first at Leiden, the Netherlands in 2001. The program consisted of 4 short courses, 39 technical sessions on 23 different subjects, 2 poster sessions, 3 plenary sessions, 1 student chapter meeting and 1 workshop.

Panel Discussion

EDGAR HERTWICH organised and chaired a panel and general discussion to explore how Industrial Ecology (IE) could contribute to the call for sustainable development issued by the recent UN World Summit in Johannesburg. Both the choice of topic and the sometimes provocative views offered by the 3 panelists succeeded in involving the audience in an intensive exchange. HERTWICH emphasised the importance accorded at the Summit to sustainable consumption and identified it as a priority area for IE. ROLAND CLIFT's main concern was influencing policymakers, and he stressed the need for industrial ecologists to better master the art of crafting messages succinct and catchy enough to be picked up and amplified by the media. FAYE DUCHIN laid stress, instead, on the need of research on which sound messages are ultimately based. DARA O'ROURKE's view was that it is the NGOs that are the critical actors in promoting environmental objectives on behalf of civil society; they are the strategic interface between citizens in their personal households and the environmental movement which depends on citizen participation and commitment. The audience was interested in all aspects of the discussion, and the comments and questions generally endorsed the vision offered by this session: a big-picture mission for ISIE, namely contributing to sustainable development on a global scale, with the shift that entails from the mainly corporate perspective that has been evident in much of our work to a broader, public-interest perspective.

LCA in Technical Sessions

Around 200 platform and 70 poster presentations were distributed over 39 technical sessions for a variety of subjects including Material Flow Analysis (MFA), sustainability issues, eco-industrial parks, Input-Output Analysis (IOA), policy cases and education.

Life Cycle Assessment (LCA) was an important subject at Ann Arbor as well, and both methods and applications of LCA were extensively discussed throughout the sessions. An entire session was devoted to LCA and Life Cycle Management (LCM) and there were also many presentations on LCA in other sessions.

Some general trends observed among those LCA-related presentations are that a substantial part of the presentations were case studies, especially comparative LCAs, on new technologies and materials. ROSS & SKERLOS (traditional die and mold manufacturing), KOZAK & KEOLEIAN (scholarly books vs. e-book reading devices), ZIMMERMAN et al. (petroleum and bio-based metalworking fluid), BERGERSON et al. (transportation of coal by rail vs. transmission for electricity) are the examples. These studies were timely and properly showed the unique application field of LCA, namely comparison of different technologies and materials based on functional equivalency.

Then, there was a number of trans-boundary applications of LCA transformed into relevant shapes to be used for various issues in IE including sustainable consumption and environmental policy-making. HUPPES et al. discussed the approach of dealing with various problems of environmental systems analysis in different system definitions, scales and time specifications. NORRIS & AMLIN presented how input-output (IO) LCA can be used for sustainable consumption analysis in dynamic form. FERRÃO et al. showed an LCA of food and beverage packaging used for policy definition study in Portugal. These studies highlighted the potentials of LCA in broader IE applications.

Further, IO- and hybrid LCA had been successfully absorbed in general LCA practices, so that, to our calculation, around one fourth of the whole LCA-related presentations employed IO- or hybrid approaches. A similar trend was acknowledged in the last SETAC-Europe conference as well (see REBEITZER et al. 2003). Some examples are: STRØMMAN et al. analysed the fuel chains for Liquid Natural Gas (LNG), methane and hydrogen using hybrid LCA; HIRAO et al. used the IO table of Japan to assess the effect of cascade recycling of fluoronitric acid between semiconductor and steel industry. These two and other presentations showed that hybrid approaches have been well accepted by LCA practitioners as practical solutions to the problem of system boundary in LCA, and, further, IOA started to be explored in other areas of LCA including scenario developments and dynamic studies.

Overall, both methodological developments and case studies were presented, while the main focus was on the application side rather than on pure LCA methodology. Especially discussions on Life Cycle Impact Assessment (LCIA) methodology were quite rare, and we could locate only one presentation on that subject, which was the one by MCKONE on the evaluation of data and models of health impacts by transportation systems in LCA. It is good to see that each of the international conferences, where LCA is in the focus, e.g. SETAC, EcoBlance, InLCA as well as ISIE, has developed its own profile with unique features.

Closing Session

The closing session was chaired by THOMAS GRAEDEL, the president of the society. JOSEF KAENZIG was the first winner of the poster prize with his study 'Input/Output Life Cycle Assessment of Air Transportation'. The second winner of the poster prize was ANA CITLALIC GONZALEZ MARTINES with her presentation, 'Material Flow Analysis for Spain (1980–2000)'. ISIE newly arranged two IE awards, 1. the Laudise Prize for young scientists, named after a former AT&T researcher, ROBERT LAUDISE (1930–1998), and 2. another one for all industrial ecologists in general. The Laudise prize was awarded to EDGAR HERTWICH to acknowledge his outstanding contributions to IE including his recent initiatives on sustainable consumption studies. The other IE award went to ROBERT U. AYRES. MARINA FISCHER-KOWALSKI rightly described his extraordinary achievements by saying that there is not a single area in IE where his piercing insights had not been reached long before people started to think about it. Ayres himself could not attend the ceremony.

IE Workshop

The last official event of the conference was the IE workshop on IOA in IE, co-organised by SANGWON SUH and FAYE DUCHIN and held as the second meeting of the SETAC-ISIE joint Working Group (WG) on IOA. With more than 70 participants, a panel discussion, individual presentations and subsequent discussions, in which the audience was actively participated, were held within the workshop.

The panel discussion, chaired by SUH, started with a few lemmas on the role of IOA in IE. In her response, DUCHIN emphasised the need of correctly formulated questions to be answered through IOA in IE. In the same light GJALT HUPPES pointed out that the type questions to be answered deter-

mines the specifications of the system that should be used to answer the question and showed how IOA can be effectively utilised in different ways for different system specifications. With his impressive slides YUICHI MORIGUCHI described various tools in IE including LCA, MFA and SFA as players who aim at achieving ultimately the same goal and articulated the role of IOA in linking micro-, meso- and macro-level systems in a consistent fashion. ARPÁD HORVÁTH pointed out that IOA can be used in IE not only for LCA but also for various other areas including education and policy-making and called for a global co-ordination for developments of international IO-based tools. Noting the early works by BRUCE HANNON, REID LIFSETT regarded the possibilities of IOA to connect one system with others as the strengths of IOA. He rightly said, however, that cautions are to be made by carefully considering both added values and costs in applying IOA in IE. Throughout the panel discussion and the subsequent exchanges with the audience, it was generally agreed that IOA has great potentials in IE both as a tool and as a conceptual framework; however, there are also limitations which require a good guidance as well as further researches.

In general, the workshop served as an interface between IO-users and non-users among the IE community and contributed to gaining a common understanding between the two of them. As a next step it was announced during the workshop that two books are planned to be published by the WG, one is an introduction to hybrid LCA, and the other a handbook on input-output economics in industrial ecology (contact SANGWON SUH for your potential contribution: suh@cml.leidenuniv.nl).

General Reflections

The meeting rooms were all in close proximity to each other, surrounded a courtyard with ample seating areas. In this way the organisers succeeded in providing a setting where there were opportunity, time, and space for extensive informal interactions including meeting new colleagues. Overall, the conference was dynamic, filled with enthusiasm, open to new ideas, and informative.

References

- [1] The conference web site: <http://css.snr.umich.edu/isie2003/>
- [2] Rebitzer G, Köhler A, Suh S, Klöpffer W, Jolliet O, Saur K (2003): Theory and Practical Implementation of Life Cycle Assessment. *Int J LCA* 8 (4) 235–240

From the Editorial 'Industrial Ecology and LCM: Chicken and Egg?' by John R. Ehrenfeld, Executive Director 'International Society for Industrial Ecology' [Int J LCA 8 (2) 59–60 (2003)].

"Let me begin with industrial ecology. Its origins are somewhat fuzzy, but most agree that the concepts that constitute the field arose from observers noting that flows of energy and materials in industrial economies have many features analogous to similar flows in ecological systems. Early researchers used the term industrial metabolism, again suggestive of a living system [2]. This ecological metaphor has produced two more or less separate sets of practice. The first, industrial ecology's objective side, is that of researchers and analysts trying to gain a better and deeper understanding of industrial economies. They have developed tools along the way, for example, material flow accounting (MFA) and substance flow analysis (SFA). The analytic usefulness of the systems framework of indus-

trial ecology has become apparent to planners and policymakers charged with developing national and regional policies. Standard policy-making has generally ignored material flows, and is inadequate when addressing environmental resource issues and sustainability.

A second, normative, as opposed to objective, aspect can be found in the work of others within the industrial ecology community who see its concepts, particularly the ecological metaphor, as a framework for designing (more) sustainable societies. For them, natural systems can be seen as examples of sustainability showing robustness over long periods of time in ways not yet seen in human systems. The critical difference in this second manifestation of the concept is that the actors are involved in design rather than in normal, everyday activities. I believe that this distinction is very important." John.Ehrenfeld@alum.mit.edu